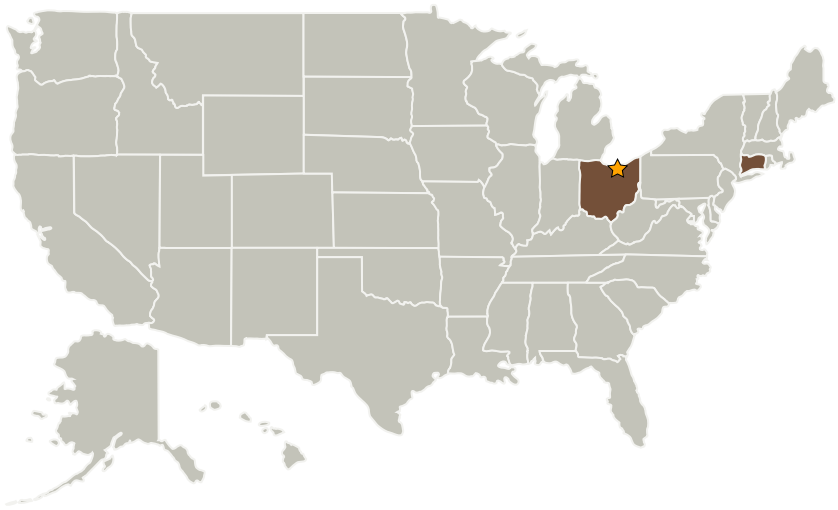
On-Demand Urine Analyzer, Phase II

Completed Technology Project (2004 - 2006)

Project Introduction

The overall goal of this program (through Phase III) is to develop an analyzer that can be integrated into International Space Station (ISS) toilets to measure key chemicals in urine. The analyzer will employ a novel metal-doped sol-gel material to both separate these key chemicals from urine and provide surface-enhanced Raman spectra to identify and quantify these chemicals. The Phase I program successfully demonstrated feasibility by chemically extracting 3-methyl histidine, a muscle-loss indicator, and raloxifene a bone-loss inhibitor from simulated urine. In flowing experiments, both chemicals were measured at 10 nanogram/mL, below the required detection limit of 1000 ng/mL for 3-methyl histidine, and near the required detection limit of 1 ng/mL for raloxifene. The Phase II program will develop the method of analysis using some 50 bio-indicators, drugs and metabolites, and potential interfering urine components. The program will also design and build an automated extraction, measurement and analysis system suitable for integration into Hamilton Sundstrand's proposed ISS toilets. Hamilton Sundstrand has agreed to an on-site demonstration that includes initial measurements using the proposed analyzer and their equipment to initiate a Phase III collaboration.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Real-Time Analyzers, Inc.	Supporting Organization	Industry	Middletown, Connecticut

Primary U.S. Work Locations	
Connecticut	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors